

Date: Sat, 3 Sep 94 04:30:23 PDT
From: Ham-Homebrew Mailing List and Newsgroup <ham-homebrew@ucsd.edu>
Errors-To: Ham-Homebrew-Errors@UCSD.Edu
Reply-To: Ham-Homebrew@UCSD.Edu
Precedence: Bulk
Subject: Ham-Homebrew Digest V94 #262
To: Ham-Homebrew

Ham-Homebrew Digest Sat, 3 Sep 94 Volume 94 : Issue 262

Today's Topics:

Circuit Bd Software for Macs
Design of Helical Resonator Filter for VHF?
More on Receivers that Radiate
Pocket SW Receiver Design (2 msgs)
Zenon strobe-light circuit

Send Replies or notes for publication to: <Ham-Homebrew@UCSD.Edu>
Send subscription requests to: <Ham-Homebrew-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Homebrew Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-homebrew".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: 1 Sep 1994 17:11:49 GMT
From: solaris.cc.vt.edu!box185.ams.vt.edu!user@uunet.uu.net
Subject: Circuit Bd Software for Macs
To: ham-homebrew@ucsd.edu

Does anyone know of software to develop circuit boards designed for the Mac???

--
Ranson Pelt
pelt@vt.edu
nz4i

Date: Fri, 02 Sep 1994 08:47:04 -0500
From: psinntp!pbs.org!jernandez.pbs.org!user@uunet.uu.net
Subject: Design of Helical Resonator Filter for VHF?
To: ham-homebrew@ucsd.edu

Has anyone had luck building a helical resonator filter at VHF? I have the design equations, but it appears that the design may be too unforgiving for simple construction. My requirements are 160 MHz center frequency with a 2 MHz 3 dB BW. The stopband slope should have frequencies at 158 MHz down >50 dB. Has anyone had luck designing and building similar filters?

--

John J. Hernandez
Communication Systems Engineer
Public Broadcasting Service

"My Favorite Location On the Pennsy" MP-46.8 Plainsboro, NJ

E-Mail jernandez@pbs.org Member:PRR Technical & Historical Society
Phone: 703-739-5474 Southern Railway Historical Association
Amateur Radio: KA2YAP

Date: 02 Sep 1994 13:22:41 GMT
From: ihnp4.ucsd.edu!dog.ee.lbl.gov!agate!howland.reston.ans.net!gatech!
newsxfer.itd.umich.edu!nntp.cs.ubc.ca!unixg.ubc.ca!newshost.ucs.ubc.ca!
dalton@network.ucsd.edu
Subject: More on Receivers that Radiate
To: ham-homebrew@ucsd.edu

In article <1994Sep2.021107.12466@egreen.wednet.edu> jmollan@egreen.iclnet.org
(John Mollan - Harm) writes:

Back in the days of WW II the German U-boat crews would tune receivers to Allied radar frequencies to see if there were any planes or ships near. The Allies retaliated by turning their radar off and listening for the oscillators in the U-boats' receivers. Apparently this worked well enough for the practice to be used during the rest of the war.

In the days of VHF AM, T-hunters would quite often listen for the signal being radiated by the superregen receivers on the infamous Heath Twoers and Sixers as they got close to the target.

I would be interested any other interesting stories along the same line.

Is there a U-shaped waveguide in the ocean due to the temperature and salinity stratification (and associated changes in electrical conductivity and c) that would cause radar and acoustic waves to turn? If so, does anybody know what the length and turning depth scales would be for different frequencies,

polarizations, and depth profiles? Probably
whale and dolphin frequencies are an important
subset of the acoustic set, and the radar
frequencies or even infrared frequencies
might be important for certain biota.

--

David Dalton ----geophysics Ph.D student----- <Dalton@Geop.UBC.Ca> ---
Dept. of Geophysics & Astronomy, (604) 822-2267
2219 Main Mall, University of British Columbia fax 822-6047
Vancouver, Canada V6T 1Z4 home 733-1303

Date: 2 Sep 94 23:21:28 GMT
From: news-mail-gateway@ucsd.edu
Subject: Pocket SW Receiver Design
To: ham-homebrew@ucsd.edu

Hmmm... That sounds like a fun project.

I would have a tendency to go with a semi-up-conversion receiver.

A simple (albiet not really high performance) receiver could be
constructed using an NE605 (I think that that is an NE602 and an NE604
clanged together in one handy-dandy package...)

In this case, use a 10.7 MHz IF.

Some reasonably narrow (for AM, anyway) and inexpensive monolithic
crystal filters can be obtained for 10.7 MHz (heck, you can order
a bunch of \$0.89 crystals from Jameco and make your own, if you want
it <4 KHz or so... Not for 10.7 MHz, but for others...) Digi-Key has
some filters for 12.5 KHz spacing that are on the order of 10 KHz wide or
so (get a pair of the "2 pole monolithics" and cascade them - they are
about \$5.36 each in the current catalog) and have a decently sharp, but
listenably wide IF.

A 10.7 MHz IF would put your image 21.4 MHz away (you would obviously
have to use high-side injection for almost anywhere on HF) but if you are
putting int on 49 meters, then a 16.5-17.0 MHz LO would be in order.

If you wanted, you could expand the range of the LO (as a VCO, maybe...
use an NTE618 hyperabrupt tuning diode and you can get almost an octave
of unswitched VCO range... at the sacrifice of stability, though...) Gee...
you could make this do-hicky cover 10 meters and (ICK!) 11 meters at the
same time, with the same 49 meter LO...

For AM detection you could use the RSSI (Received Sig. Strength Indicator)

output of the '605 (it has a good log curve of almost 90db!) if you didn't mind a bit of audio distortion, or a simple envelope detector could be used.

Hey, you could even have an "afc" in there... use the '605's discriminator and make it "lock" on to the carrier of the AM signal and help compensate for drift...

Oh, and the RSSI could be part of your AGC circuit...

The '605, like the '602 has a fairly fragile mixer. It will be easily crushed by 500 kw shortwave transmitters, but its noise figure (<6db) is unnecessarily low for low HF if you are using a decent antenna. If you are using a telescoping antenna, then perhaps it is just fine...

Also, the '605 pulls on the order of 10 mills by itself. It has its own L0 that may be free-running, or it can be xtal controlled with overtone or fundamental-mode xtals. You may be able "rubber" your L0 xtal for 50 KHz and cover your interested part of the 49 meter band in a small number of xtals with relatively good stability...

Well, I'm starting to ramble, but an up-conversion single-conversion HF receiver would work well, I think.

If you do use an external envelope detector, just make sure you put it before the limiter:-)

<Clint>

Email: ka7oei@uugate.wa7slg.ampr.org

Date: 1 Sep 1994 22:00:23 GMT

From: ihnp4.ucsd.edu!muninari.oz.au!yarrina.connect.com.au!

harbinger.cc.monash.edu.au!yeshua.marcam.com!usc!howland.reston.ans.net!

vixen.cso.uiuc.edu!hskim@network.ucsd.edu

Subject: Pocket SW Receiver Design

To: ham-homebrew@ucsd.edu

John Marvin Zelle (zelle@cs.utexas.edu) wrote:

> I started a recent thread on regenerative receivers which eventually
> turned into an interesting discussion superegenerative sets. I also
> got a number of very interesting direct responses, however, all the
> info has lead to more questions. So I would like to pose a more general
> question to the wisdom of the net. Namely, what type of receiver would
> you recommend for a small portable shortwave. Here are the general design
> specs I'm working under:

> (Relatively) small parts count. I want to keep it small with simple
> "ugly" construction. (I don't like etching boards). Low battery
> drain. Simple, reliable design (easy to get working without
> sophisticated test equipment as I still build these guys without a
> scope). Enough sensitivity to receive moderate to strong
> international broadcasters with only a short makeshift antenna.
> Enough selectivity that I have a reasonable chance of single-signal
> reception in the international shortwave bands. Frequency coverage
> need only be one band (probably 49 meters), but others would be a
> plus.

This size/# of parts restriction would severely limit your choice.
I could be wrong, but in my opinion you really have to stick to a
very simple design if you use "ugly" or "dead-bug" construction
because even a single-superhet AM broadcast receiver built this way
would not easily fit in your pocket. On the other hand, sensitivity
and frequency coverage would be no problem if you only want to
listen to strong SW stations.

> Here're some design ideas to get the ball rolling:

> Superhet: It's been argued that no alternative (regen, super, dc) can give
> similar performance. But... It would have to be dual conversion to eliminate
> images. Perhaps a couple of NE602s? Would simple LC filtering of a couple
> of IF stages give sufficient ultimate selectivity? What about using ceramic
> filters, first stage 10.7 Mhz, second 455Khz? Doesn't sound very simple.
> I've built nice sets, but those designs are not suitable for a portable.

Designing a narrow LC filter with discrete components is not an easy task,
as I remember having a rather hard time building a 5-pole BPF with 100kHz
BW even with a network analyzer. On the other hand, ceramic filters
are readily available, small, and convenient. These are also available in IF
other than 10.7MHz or 455KHz, for example, 4.5 to 5.5MHz. So, for double-het,
you can use one with 150KHz at 10.7MHz and another with 6 or 8KHz BW at
455KHz. By the way, there are several ICs with mixer, diode and
ring detectors, gain stages and more that will make your design simple.
Suggestion: go get a simple shareware PCB design software and etch your
own board. It's not that bad. (It's much better than making pattern from
the scratch all by hand as I used to do in the past.)

> Regenerative: Smaller parts count, but there seems to be broad disagreement
> on whether selectivity would be adequate at 5-10 Mhz. Additional advantage
> of allowing multiple bands by simply switching a single tuned circuit.

> SuperRegen: Don't know too much about this. Any pointers to possible design
> articles? What is the advantage over regenerative?

I'd rather call this a radiator or a jammer. Once built a VHF one and found it causes much more TVI than my 100W TX on 10m. Then again, I don't know much about these guys as I gave up on them so early.

> Direct Conversion: Simple design, audio filtering easy. But... A
> free-running VFO will not be stable enough for good-quality AM
> detection without frequent retuning (I know, I've built some very good
> ones, but any tiny drift really beats with the carrier and ruins the
> audio). What about phase-locking directly to the incoming signal (is
> that synchrodyne?). I've never designed with phase-locked loops, so
> pointers here would be very helpful. Is it feasible below 10 Mhz that
> there is some off-the-shelf chip which would provide suitable VCO and
> phase comparator? Is it easy to get sufficient VCO range and small
> enough locking range that neighboring signals could actually be
> independently captured, or would strong signals hog the PLL?

Maybe the best concept in simple receiver design and also the best candidate for yours, if PLL is simple and easy for you. As I understand, PLL was developed for the homodyne (or synchrodyne) receivers which is an ancestor to the direct-conversion receiver. I once saw a one-chip AM synchronous detection receiver based on NE562 (or 564?) PLL chip, which was amazingly simple. VCO range and locking wouldn't be a problem over 1MHz segment at HF.

> Those are the ideas. I'm particularly interested in the Regen and synchrodyne
> ideas. I would especially appreciate ideas on the latter. Has there been a
> construction article for a synchrodyne receiver? If the general wisdom is
> that only a superhet will suffice, that's the way I'll go. I just don't have
> time to try everything.

> This is a bit of a long post, but I hope it will generate some interesting
> discussion of possible designs.

Good luck.

> --John

> --

> *** John Zelle	e-mail: zelle@cs.utexas.edu	***
> *** Taylor Hall 2.124	motto : I'd rather write programs which	***
> *** University of Texas	write programs than waste my	***
> *** Austin, TX 78712-1188	time writing programs	***

Han..

--

Han Seok Kim	hskim@uiwpls.ece.uiuc.edu
Wave Propagation Lab.	(217) 333 - 4406
Univ. of Illinois at Urbana-Champaign	Linux - to die for

Date: Fri, 2 Sep 1994 03:04:43 GMT
From: ihnp4.ucsd.edu!dog.ee.lbl.gov!agate!howland.reston.ans.net!
europa.eng.gtefsd.com!news.umbc.edu!eff!news.duke.edu!zombie.ncsc.mil!
blackbird.afit.af.mil!sd2!parkerbk@network.ucsd.edu
Subject: Zenon strobe-light circuit
To: ham-homebrew@ucsd.edu

I realize this isn't a radio question however it is
requiring a homebrew idea (s).
What I need is a circuit to operate a xenon strobe
light at least two flashes per second on 12 volts.
any ideas would be greatly appreciated.
e-mail- parkerbk@sd2.sews.wpafb.af.mil
Thanks
Keith

Date: Thu, 1 Sep 1994 15:00:58 GMT
From: psinntp!arrl.org!dnewkirk@uunet.uu.net
To: ham-homebrew@ucsd.edu

References <515@ted.win.net>, <1994Aug29.152234.29324@arrl.org>,
<CvBCA0.FBy@csn.org>
Subject : Re: regenerative sets and selectivity

Brent G. DeWitt (bdewitt@csn.org) wrote:

: In general, regens DO radiate! The FCC requires that they be CERTIFIED
: with the FCC before commercial sale, while super-hets only require
: notification. None of this means a thing as an experimenter building one
: item for his/her use, but it does imply that history has shown regens to
: be pretty good transmitters.....

I just took a look at Part 15 in the most recent CFR 47 I could get my
hands on rapidly -- 1988 -- and although I again see that although FCC
requires superregenerative receivers to be certified -- superregenerative
receivers for the CB band, for 30-901 MHz, and for 935-940 MHz, that is
[don't have the book right in front of me, so I may have one or two of these
ranges slightly bollixed] -- I can't find anything about *regenerative*
receivers. I'd appreciate receiving information to the contrary.

Regards,

David Newkirk, WJ1Z

Senior Assistant Technical Editor, *QST*

End of Ham-Homebrew Digest V94 #262
